WHAT IS CLAIMED IS:

1. An automatic rearview mirror system for an automotive vehicle comprising:

at least one variable reflectance rearview mirror;

an array of sensing elements to sense light levels in an area rearward of said at least one variable reflectance rearview mirror, each of said sensing elements adapted to sense light levels of light incident thereon and to output an electrical signal indicative of said sensed light levels;

a signal processor, connected to said array of sensing elements, receiving and using the electrical signals indicative of the sensed light levels from said sensing elements to determine a first electrical signal indicative of a background light level in the area rearward of said at least one variable reflectance rearview mirror and to determine a second electrical signal indicative of at least one peak light level in the area rearward of said at least one variable reflectance rearview mirror,

1067 2/21/96 wherein said signal processor determines at least one control signal indicative of ~~the~~ a desired reflectance level of the at least one variable reflectance rearview mirror from the first electrical signal indicative of the background light level and the second electrical signal indicative of the at least one peak light level; and

at least one drive circuit connected to said signal processor and to said at least one variable reflectance rearview mirror for receiving said at least one control signal and generating and applying at least one drive signal to said at least one variable reflectance rearview mirror to drive said at least one variable reflectance mirror to the desired reflectance level.

2. The automatic rearview mirror system defined by Claim 1, further comprising an imaging system to focus an image of the area rearward of said at least one variable reflectance rearview mirror onto said array.

3. The automatic rearview mirror system defined by Claim 2, wherein said imaging system comprises a lens.

4. The automatic rearview mirror system defined by Claim 3, further comprising a semiconductor substrate on which said array of sensing elements is formed.

5. The automatic rearview mirror system defined by Claim 4, wherein said imaging system is constructed integrally with said array of sensing elements.

6. The automatic rearview mirror system defined by Claim 5, wherein said array of sensing elements and said signal processor are constructed on said semiconductor substrate as an integrated circuit.

7. The automatic rearview mirror system defined by Claim 1, wherein said at least one variable reflectance rearview mirror is an electrochromic mirror.

8. The automatic rearview mirror system defined by Claim 1, wherein said signal processor is an integrated circuit.

9. The automatic rearview mirror system defined by Claim 1, further comprising a memory, connected to said array and to said signal processor, receiving and storing the electrical signals output by said sensing elements, wherein said signal processor receives the electrical signals stored in said memory.

10. The automatic rearview mirror system defined by Claim 9, wherein said memory is a random-access-memory.

11. The automatic rearview mirror system defined by Claim 1, wherein said signal processor is a microprocessor.

Sub A1

~~12. The automatic rearview mirror system defined by Claim 1, further comprising a memory, connected to said array and said signal processor, receiving and storing the electrical signals output by said sensing elements,~~

~~wherein said signal processor receives the electrical signals from said memory to determine the first and second electrical signals and stores the first and second electrical signals in said memory,~~

~~wherein said signal processor receives the first and second electrical signals from said memory to determine the at least one control signal.~~

13. The automatic rearview mirror system defined by Claim 1, wherein said signal processor determines said second electrical signal indicative of at least one peak light level in at least one zone of said area rearward of said at least one variable reflectance rearview mirror.

14. The automatic rearview mirror system defined by Claim 13,

wherein said signal processor determines a plurality of the second electrical signals indicative of a plurality of peak light levels, wherein each of the second electrical signals correspond to at least one zone of the area rearward of said at least one variable reflectance mirror, and

wherein said signal processor determines and outputs a corresponding plurality of the control

signals based on the first and the plurality of second electrical signals.

Sub A2

15. The automatic rearview mirror system defined by Claim 1, wherein said signal processor samples the electrical signals indicative of the sensed light levels at a substantially constant sampling rate and varies the exposure time depending on the background light level in the area rearward of said at least one variable reflectance rearview mirror.

16. The automatic rearview mirror system defined by Claim 1, wherein said array of sensing elements is a photosensor array and said sensing elements are photosensor elements arranged in a two-dimensional array of rows and columns, wherein each of said photosensor elements generates a photosensor element signal indicative of the light levels of light incident thereon.

38 ~~17~~. The automatic rearview mirror system defined by Claim 1, wherein said at least one variable reflectance rearview mirror comprises a plurality of segments each of whose reflectance is independently controllable by said signal processor, and wherein said signal processor controls each of the segments of said at least one variable reflectance rearview mirror using the electrical signals from a corresponding set of sensing elements of said array.

17 ~~18~~. The automatic rearview mirror system defined by Claim 16, wherein said signal processor determines the first electrical signal indicative of the background light level by calculating an average of the photosensor element signals indicative of the light levels of light incident on said photosensor elements in the lowest X rows of said photosensor array, wherein

X is a positive integer less than the number of rows in said photosensor array.

Sub A3

19. The automatic rearview mirror system defined by Claim 16, wherein said signal processor determines the first electrical signal indicative of the background light level by calculating an average of X percent of the photosensor element signals indicative of the light levels of light incident on said photosensor elements, where X is a positive number.

~~20~~ 19. The automatic rearview mirror system defined by Claim ~~19~~ 18 wherein X is approximately 100.

Sub A4

21. The automatic rearview mirror system defined by Claim 16, wherein said signal processor determines the first electrical signal indicative of the background light level by calculating an average of X percent of photosensor element signals indicative of the lowest light levels of light incident on said photosensor elements, wherein X is a positive number.

~~22~~ 21. The automatic rearview mirror system defined by Claim ~~21~~ 20, wherein X is between approximately 5 and 100.

~~23~~ 22. The automatic rearview mirror system defined by Claim ~~21~~ 20, wherein X is approximately 75.

Sub A5

24. The automatic rearview mirror system defined by Claim 16, wherein said signal processor determines the second electrical signal indicative of the at least one peak light level by determining the average value of Y percent of photosensor element signals indicative of the highest light levels of light incident on a predetermined set of said photosensor elements, wherein Y is a positive number.

51

24 ~~25~~. The automatic rearview mirror system defined by Claim 23 ~~24~~, wherein Y is in the range of from approximately 1 to 25.

25 ~~26~~. The automatic rearview mirror system defined by Claim 23 ~~24~~, wherein Y is approximately 10.

26 ~~27~~. The automatic rearview mirror system defined by Claim 16, wherein said signal processor determines said control signal according to the formula:

$$V_C(z) = V_1 + (R_1 - S \times C_T \times B/P(z)) \times (V_2 - V_1)/(R_1 - R_2),$$

wherein V_C is the voltage of the at least one control signal determined by said signal processor, V_1 is the approximate voltage which, when applied to said at least one variable reflectance rearview mirror, causes said at least one variable reflectance rearview mirror to begin perceptibly decreasing its reflectance from its maximum reflectance level R_1, S is a sensitivity factor, C_T is the maximum contrast ratio of the peak light level to the background light level, B is the background light level, P(z) is the at least one peak light level, and V_2 is the approximate voltage which, when applied to said at least one variable reflectance rearview mirror, causes said at least one variable reflectance rearview mirror to decrease its reflectance to approximately its minimum reflectance level R_2.

27 ~~28~~. The automatic rearview mirror system defined by Claim 16, wherein said signal processor tests the photosensor element signal output from each photosensor element to determine whether the photosensor element signal output from each photosensor element is indicative of a peak light level or a background light level.

28 ~~29~~. The automatic rearview mirror system defined by Claim 27 ~~28~~, further comprising an imaging system comprising a lens to focus an image of the area rearward of said at least one variable reflectance rearview mirror onto said photosensor array of photosensor elements, wherein said system further comprises means for applying a lens correction factor to each photosensor element signal output from each photosensor element.

29 ~~30~~. The automatic rearview mirror system defined by Claim 28 ~~29~~, wherein the lens correction factor is in the range of approximately 1 to 15.

30 ~~31~~. The automatic rearview mirror system defined by Claim 27 ~~28~~, wherein said signal processor determines a value indicative of the light level sensed by each photosensor element and compares each determined value with a predetermined peak threshold value to determine whether the photosensor element signal output from each photosensor element is indicative of a peak light level or a background light level.

31 ~~32~~. The automatic rearview mirror system defined by Claim 30 ~~31~~,

wherein said signal processor determines that a photosensor element signal output from one of said photosensor elements is indicative of a background light level when the determined value indicative of the sensed light level of said one of said photosensor elements is not greater than the peak threshold value, and

wherein said signal processor determines that a photosensor element signal output from said one of said photosensor elements is indicative of a peak light level when the determined value indicative of the

sensed light level of said one of said photosensor elements is greater than the peak threshold value.

32 ~~33~~. The automatic rearview mirror system defined by Claim 31 ~~32~~, wherein the peak threshold value is in the range of approximately 200 to 255.

34. The automatic rearview mirror system defined by Claim 30 ~~31~~, wherein said signal processor determines the first electrical signal, indicative of a background light level by summing the determined values determined to be not greater than the peak threshold value and dividing the resulting sum by the number of determined values determined to be not greater than the peak threshold value.

33 ~~35~~. The automatic rearview mirror system defined by Claim 31 ~~32~~, wherein said signal processor counts the number of determined values greater than the peak threshold value in a predetermined set of determined values corresponding to a predetermined set of photosensor elements and determines the second electrical signal indicative of the at least one peak light level in the area rearward of said at least one variable reflectance rearview mirror as a function of the number of determined values greater than the peak threshold value in the predetermined set of determined values.

35 ~~36~~. The automatic rearview mirror system defined by Claim 30 ~~31~~,

wherein said photosensor array means is located in said at least one variable reflectance rearview mirror so as to receive light through an active layer of said at least one variable reflectance rearview mirror from the area rearward of said at least one variable rearview reflectance mirror, and

wherein said signal processor applies a color correction factor to each value indicative of the sensed light level for each photosensor element to compensate for the reduction in transmitted light levels when the reflectance level of said at least one variable reflectance rearview mirror is reduced.

36 ~~37~~. The automatic rearview mirror system defined by Claim 16,

wherein said signal processor uses the first electrical signal to determine a third electrical signal indicative of a change-limited background light level in the area rearward of said at least one variable reflectance rearview mirror, and

wherein said signal processor determines the at least one control signal from the second and third electrical signals.

37 ~~38~~. The automatic rearview mirror system defined by Claim 36 ~~37~~,

wherein the automotive vehicle further comprises vehicle lighting,

wherein said signal processor determines a vehicle lighting control signal using the third electrical signal,

wherein said system further comprises at least one vehicle lighting switch, connected to said signal processor and to the vehicle lighting, receiving the vehicle lighting control signal from said signal processor and turning on or turning off the vehicle lighting in response thereto.

39. The automatic rearview mirror system defined by Claim 1, wherein the light levels in the area rearward of said at least one variable reflectance rearview mirror comprise light levels from a rear window area,

at least a portion of a right side window area and at least a portion of a left side window area, and

wherein said photosensor array has a two-dimensional field of view comprising said rear window area, said at least a portion of a right side window area and said at least a portion of a left side window area.

40. The automatic rearview mirror system defined by Claim 39, wherein said photosensor array comprises 40 rows of said photosensor elements, each row comprising 160 of said photosensor elements.

41. The automatic rearview mirror system defined by Claim 1, wherein the system comprises a plurality of said drive circuits and the variable reflectance rearview mirrors,

wherein said signal processor determines and outputs a plurality of the control signals to said plurality of said drive circuits, each of the control signals corresponding to a desired reflectance for each of said plurality of variable reflectance rearview mirrors, and

wherein said plurality of said drive circuits, in response to the control signals, generate and apply a plurality of said drive signals to said plurality of variable reflectance rearview mirrors causing each of said variable reflectance rearview mirrors to assume a desired reflectance level associated therewith.

42. The automatic rearview mirror system defined by Claim 41, wherein said photosensor array comprises a plurality of photosensor element sets, each of said sets corresponding to each of said plurality of variable reflectance rearview mirrors,

wherein said signal processor determines and outputs a plurality of said second electrical signals indicative of the at least the one peak light level,

wherein said signal processor uses the first electrical signal indicative of the background light level and the plurality of said second electrical signals to determine and output the control signal for each of said plurality of said drive circuits and said variable reflectance rearview mirrors associated therewith.

43. The automatic rearview mirror system defined by Claim 41, wherein said photosensor array comprises a first photosensor element set and a second photosensor element set, and a lens for focusing light from a rear window area and from at least a portion of a side window onto said photosensor array,

wherein said signal processor determines a first peak light signal indicative of a peak light level of light incident on the first photosensor element set,

wherein said signal processor determines a second peak light signal indicative of a peak light level of light incident on the second photosensor element set,

wherein said signal processor determines and outputs a first control signal indicative of a desired reflectance level for one of said plurality of variable reflectance rearview mirrors using the first peak light signal and the first electrical signal indicative of the background light level,

wherein said signal processor determines and outputs a second control signal indicative of a desired reflectance level for another of said plurality of variable reflectance rearview mirrors using the second peak light signal and the first electrical signal indicative of the background light level,

wherein said first control signal is received by one of said plurality of drive circuits which generates

and applies a first drive signal to one of said plurality of variable reflectance rearview mirrors causing it to assume the desired reflectance level associated therewith, and

wherein said second control signal is received by another of said plurality of drive circuits which generates and applies a second drive signal to another of said plurality of variable reflectance rearview mirrors causing it to assume the desired reflectance level associated therewith.

44. The automatic rearview mirror system defined by Claim 43, wherein said plurality of variable reflectance rearview mirrors comprise a rearview mirror, a left side view mirror and a right side view mirror,

wherein said photosensor array further comprises a third photosensor element set,

wherein said light focused from said at least a portion of a side window area comprises light from at least a portion of a left side window area and light from at least a portion of a right side window area,

wherein said signal processor determines a first peak light signal indicative of a peak light level incident on the first photosensor element set,

wherein said signal processor determines a second peak light signal indicative of a peak light level incident on the second photosensor element set,

wherein said signal processor determines a third peak light signal indicative of a peak light level incident on the third photosensor element set,

wherein said signal processor determines and outputs first, second and third control signals indicative of a desired reflectance for said rearview mirror, said left side view mirror and said right side view mirror, respectively, using each of the first, second, and third peak light signals and the first

electrical signal indicative of the background light level,

wherein each of the first, second and third control signals are output to each of said drive circuits associated therewith to generate and apply a first, second and third drive signal to said rearview mirror, said left side view mirror, and said right side view mirror, respectively, causing said mirrors to assume the desired reflectance level associated therewith.

45. The automatic rearview mirror system defined by Claim 1, wherein said array of sensing elements comprises an analog photosensor array of photosensor elements, each of said photosensor elements generating analog photosensor element signals in response to light incident thereon,

wherein said system further comprises an analog-to-digital converter connected to said analog photosensor array and said signal processor to convert the analog photosensor element signals to digital photosensor element signals,

wherein said signal processor determines the first electrical signal indicative of the background light level using the digital photosensor element signals,

wherein said signal processor determines the second electrical signal indicative of at least one peak light level using the digital photosensor element signals,

wherein the control signal determined by said signal processor is a digital control signal,

wherein said system further comprises a digital-to-analog converter connected to said signal processor and to said at least one drive circuit to convert the digital control signal to an analog control signal, and

wherein said at least one drive circuit receives the analog control signal and in response thereto

generates and applies a drive signal to said at least one variable reflectance rearview mirror to vary its reflectance level.

Sub A6

46. A control system for controlling a plurality of variable reflectance mirrors, each of which change their reflectance level in response to a drive signal from an associated drive circuit, for an automotive vehicle, comprising:

a plurality of variable reflectance mirrors;

a photosensor array mountable to face substantially towards a rear area, wherein said photosensor array comprises a plurality of photosensor element sets, each set comprising a plurality of photosensor elements, each of said photosensor elements generating a photosensor element signal indicative of a light level of light incident thereon, and each of the sets corresponding to one of said plurality of variable reflectance mirrors,

a control circuit, connected to said photosensor array, for determining and applying a plurality of control signals, each of the control signals indicative of a desired reflectance level for each of said plurality of variable reflectance mirrors in response to receiving the photosensor element signals from each of the plurality of photosensor element sets,

a plurality of drive circuits connected to said control circuit and to different ones of said plurality of variable reflectance mirrors associated therewith,

wherein each of the control signals is output to said drive circuit associated therewith, to generate and apply a drive signal to each of said plurality of variable reflectance mirrors causing each of said mirrors to assume a reflectance level.

47. The control system defined by Claim 46, wherein said control circuit determines a background light

signal indicative of a background light level in response to receiving the photosensor element signals from at least one of the photosensor element sets,

wherein said control circuit determines a plurality of peak light signals, each of said peak light signals being indicative of a peak light level incident on each of the photosensor element sets,

wherein said control circuit determines a plurality of control signals, each of the control signals determined by using the background light signal and one of the plurality of peak light signals, associated with each of the plurality photosensor element sets,

wherein said control circuit applies each of the plurality of control signals to a drive circuit associated therewith, each of said drive circuits generating and applying a drive signal to each of said variable reflectance mirrors associated therewith.

Sub A7

48. The control system defined by Claim 47, wherein said photosensor array comprises a first set and a second set of photosensor elements, and a lens for focusing light from a rear window area onto said photosensor array,

wherein said control circuit determines a first peak light signal indicative of a peak light level incident on the first photosensor element set in response to receiving photosensor element signals from the first photosensor element set,

wherein said control circuit determines another peak light signal indicative of another peak light level incident on the second photosensor element set in response to receiving photosensor element signals from the second photosensor element set,

wherein said control circuit determines a first control signal indicative of a desired reflectance for one of said plurality of variable reflectance mirrors

using the first peak light signal and the background light signal,

wherein said control circuit determines a second control signal indicative of another desired reflectance for another of said plurality of variable reflectance mirrors using the another peak light signal and the background light signal,

wherein the first control signal controls a first drive circuit to generate a first drive signal in response to which said one of said plurality of variable reflectance mirrors is driven to the desired reflectance associated therewith, and

wherein said second control signal controls a second drive circuit to generate a second drive signal in response to which said another of said plurality of variable reflectance mirrors is driven to the desired reflectance associated therewith.

49. The control system defined by Claim 48, wherein said plurality of variable reflectance mirrors comprise a rearview mirror, a left side view mirror and a right side view mirror,

wherein said light from at least one side window area comprises light from a left side window area and light from a right side window area,

wherein said photosensor array further comprises a third photosensor element set, each of said photosensor elements generating a photosensor element signal indicative of a light level incident thereon,

wherein said control circuit determines a first peak light signal indicative of a peak light level incident on the first photosensor element set in response to receiving photosensor element signals from the first photosensor element set,

wherein said control circuit determines a second peak light signal indicative of a second peak light level incident on the second photosensor element set in

response to receiving photosensor element signals from the second photosensor element set,

wherein said control circuit determines a third peak light signal indicative of a third peak light level incident on the third photosensor element set in response to receiving photosensor element signals from the third photosensor element set,

wherein said control circuit determines a first control signal indicative of a desired reflectance level of said rearview mirror using the first peak light signal and the background light signal,

wherein said control circuit determines a second control signal indicative of a desired reflectance level of said left side view mirror using the second peak level signal and the background light signal,

wherein said control circuit determines a third control signal indicative of a desired reflectance level of said right side view mirror using the third peak light signal and the background light signal,

wherein said first control signal controls a first drive circuit to generate a first drive signal in response to which said rearview mirror is driven to the desired reflectance level associated therewith,

wherein said second control signal controls a second drive circuit to generate a second drive signal in response to which said left side view mirror is driven to the desired reflectance level associated therewith, and

wherein said third control signal controls a third drive circuit to generate a third drive signal in response to which said right side view mirror is driven to the desired reflectance level associated therewith.

50. A control system for controlling at least one variable reflectance mirror for an automotive vehicle, comprising:

photosensor array means for sensing light levels in an area rearward of said at least one variable reflectance mirror and generating photosensor array signals,

means for determining a background light signal from the photosensor array signals;

means for determining a peak light signal from the photosensor array signals; and

means for controlling a reflectance level of the at least one variable reflectance mirror using the background and peak light signals.

51. The control system defined by Claim 50, wherein said controlling means comprises:

desired reflectance level determining means for determining a desired reflectance level for the at least one variable reflectance mirror by using said background and peak light signals; and

desired reflectance control means for controlling the reflectance level of the at least one variable reflectance mirror using the determined desired reflectance level.

52. The control system defined by Claim 51,

wherein said photosensor array means comprises a plurality of photosensor elements arranged in a two-dimensional array of rows and columns, each of said plurality of photosensor elements generating a photosensor element signal indicative of a light level incident thereon,

wherein said means for determining a background light signal determines the background light signal by calculating an average of the photosensor element signals corresponding to the light levels incident on said photosensor elements in the lowest X rows of said photosensor array means, wherein X is a positive

integer less than the number of rows in said photosensor array means.

Sub A8

53. The control system defined by Claim 51,

wherein said photosensor array means comprises a plurality of photosensor elements, each photosensor element generating a photosensor element signal indicative of a light level of light incident thereon,

wherein said means for determining a background light signal determines a background light signal by calculating an average of X percent of the photosensor element signals, wherein X is a positive number.

54. The control system defined by Claim 53, wherein X is approximately 100.

Sub A9

55. The control system defined by Claim 51, wherein said photosensor array means comprises a plurality of photosensor elements, each photosensor element generating a photosensor element signal indicative of a light level of light incident thereon,

wherein said means for determining a background light signal determines a background light signal by calculating an average of X percent of the photosensor element signals indicative of the lowest light levels incident on said photosensor elements, wherein X is a positive number.

56. The control system defined by Claim 55, wherein X is between approximately 5 and 100.

57. The control system defined by Claim 55, wherein X is approximately 75.

Sub A10

58. The control system defined by Claim 51, wherein said photosensor array means comprises a plurality of photosensor elements for sensing light levels in an

area rearward of said at least one variable reflectance mirror, each photosensor element generating photosensor element signals indicative of a light level incident thereon,

wherein said means for determining a peak light signal determines a peak light signal by determining the average value of Y percent of the photosensor element signals indicative of the highest light levels of light incident on a predetermined set of said photosensor elements, wherein Y is a positive number.

A 10 Amdt

59. The control system defined by Claim 58, wherein Y is in the range of approximately 1 to 25.

60. The control system defined by Claim 58, wherein Y is approximately 10.

61. The control system defined by Claim 51, wherein said desired reflectance level determining means determines a control signal indicative of the desired reflectance level according to the formula:

$$V_C(z) = V_1 + (R_1 - S \times C_T \times B/P(z)) \times (V_2 - V_1)/(R_1 - R_2),$$

wherein V_C is the voltage of the at least one control signal determined by said signal processor, V_1 is the approximate voltage which, when applied to said at least one variable reflectance mirror, causes said at least one variable reflectance mirror to begin perceptibly decreasing its reflectance from its maximum reflectance level R_1, S is a sensitivity factor, C_T is the maximum contrast ratio of the peak light level to the background light level, B is the background light level, P(z) is the at least one peak light level, and V_2 is the approximate voltage which, when applied to said at least one variable reflectance mirror, causes said at least one variable reflectance mirror to

decrease its reflectance to approximately its minimum reflectance level R_2.

Sub A11

62. The control system defined by Claim 51, wherein said desired reflectance level determining means tests the photosensor array signals to determine whether each photosensor array signal is indicative of a peak light level or a background light level.

63. The control system defined by Claim 62, further comprising an imaging system comprising a lens to focus an image of the area rearward of said at least one variable reflectance mirror onto said photosensor array means, and means for applying a lens correction factor to each photosensor array signal.

64. The control system defined by Claim 63, wherein the lens correction factor is in the range of approximately 1 to 15.

Sub A12

65. The control system defined by Claim 62, wherein said desired reflectance level determining means determines a value indicative of the sensed light level corresponding to each photosensor array signal and compares each determined value with a predetermined peak threshold value to determine whether each photosensor array signal is indicative of a peak light level or a background light level.

66. The control system defined by Claim 65, wherein said desired reflectance level determining means determines that a photosensor array signal is indicative of a background light level when the determined value indicative of the sensed light level corresponding to one of the photosensor array signals is not greater than the peak threshold value, and

A12 Contd

wherein said desired reflectance level determining means determines that a photosensor array signal is indicative of a peak light level when the determined value indicative of the sensed light level corresponding to the one of the photosensor array signals is greater than the peak threshold value.

67. The control system defined by Claim 66, wherein the peak threshold value is in the range of approximately 200 to 255.

Sub A13

68. The control system defined by Claim 66, wherein said desired reflectance level determining means determines the background light signal by summing the determined values determined to be not greater than the peak threshold value and dividing the resulting sum by the number of determined values determined to be not greater than the peak threshold value.

69. The control system defined by Claim 66, wherein said desired reflectance level determining means counts the number of determined values greater than the peak threshold value in a predetermined set of determined values corresponding to a predetermined set of photosensor elements of said photosensor array means and determines the peak light signal in the area rearward of the at least one variable reflectance mirror as a function of the number of determined values greater than the peak threshold value in the predetermined set of determined values.

70. The control system defined by Claim 65,

wherein said photosensor array means is located in the at least one variable reflectance mirror so as to receive light through an active layer of said at least one variable reflectance mirror from the area rearward of said at least one variable reflectance mirror, and

A13 Cont'd

~~wherein said desired reflectance level determining means applies a color correction factor to each value indicative of the sensed light level for each photosensor array signal to compensate for the reduction in transmitted light levels when the reflectance level of the at least one variable reflectance mirror is reduced.~~

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71. The control system defined by Claim 51,

wherein said desired reflectance level determining means uses the background light signal to determine a change-limited background light signal, and

wherein said desired reflectance level determining means uses the change-limited background signal to determine the desired reflectance level.

72. The control system defined by Claim 51, further comprising means for determining a plurality of peak light signals, wherein said means for determining a desired reflectance determines the desired reflectance for a plurality of variable reflectance mirrors using the background light signal and the plurality of the peak light signals, and

wherein said desired reflectance control means controls each of said plurality of variable reflectance mirrors using the desired reflectance for each of said plurality of variable reflectance mirrors.

73. The control system defined by Claim 72, wherein said photosensor array means comprises a first set and a second set of photosensor elements, and a lens for focusing light from a rear window area and from at least a portion of a side window onto said photosensor array means, each photosensor element generating a photosensor element signal indicative of a light level incident thereon,

wherein said means for determining a plurality of peak light signals determines a peak light signal indicative of a peak light level of light incident on the first photosensor element set from photosensor element signals of the first set and determines another peak light signal indicative of another peak light level of light incident on the second photosensor element set from photosensor element signals of the second set,

wherein said means for determining a desired reflectance determines the desired reflectance for one of said variable reflectance mirrors using the peak light signal corresponding to the first photosensor element set and the background light signal, and

wherein said means for determining a desired reflectance determines the desired reflectance for another of said variable reflectance mirrors using the peak light signal corresponding to the second photosensor element set and the background light level.

74. The control system defined by Claim 73, wherein the plurality of variable reflectance mirrors comprises a rearview mirror, a left side view mirror and a right side view mirror, wherein said light from a side window area comprises light from at least a portion of a left side window area and light from at least a portion of a right side window area,

wherein said photosensor array means comprises a third set of photosensor elements, each of said photosensor elements generating a photosensor element signal indicative of a light level incident thereon,

wherein said means for determining a plurality of peak light signals determines a first peak light signal indicative of a peak light level of light incident on the first photosensor element set, a second peak light signal indicative of a peak light level of light

~~74~~ 79

incident on the second photosensor element set and a third peak light signal indicative of a peak light level of light incident on said third photosensor element set from photosensor element signals associated, respectively, with the first, second and third photosensor element sets,

wherein said means for determining a desired reflectance determines a desired reflectance of said rearview mirror using the first peak light signal and the background light signal,

wherein said means for determining a desired reflectance determines a desired reflectance of said left side mirror using the second peak light signal and the background light signal,

wherein said means for determining a desired reflectance determines a desired reflectance of said right side mirror using the third peak light signal and the background light signal, and

wherein said desired reflectance control means controls the rearview mirror, the left side mirror, and the right side mirror, respectively, using the desired reflectances of the rearview mirror, the left side mirror, and the right side mirror.

75. The control system defined by Claim 51, wherein said photosensor array signals are analog signals,

wherein said system further comprises analog-to-digital conversion means for converting the analog photosensor array signals to digital photosensor array signals,

wherein said means for determining a background light signal determines a background light signal from the digital photosensor array signals, and

wherein said means for determining a peak light signal determines a peak light signal from the digital photosensor array signals,

wherein said desired reflectance level determining means determines the desired reflectance level and produces a digital control signal indicative thereof,

wherein said system further comprises digital-to-analog conversion means to convert the digital control signal to an analog control signal, and

wherein said desired reflectance control means controls the reflectance level of the at least one variable reflectance mirror using the analog control signal.

76. A method of controlling the reflectance of at least one variable reflectance mirror comprising the steps of:

sensing light levels in an area rearward of the at least one variable reflectance mirror with an array of sensing elements;

determining a background light level from the sensed light levels;

determining a peak light level from the sensed light levels; and

controlling a reflectance level of the at least one variable reflectance mirror using the determined background and peak light levels.

77. The method defined by Claim 76,

wherein the array has a plurality of rows of sensing elements, and

wherein said step of determining a background light level comprises the step of determining the background light level by calculating an average of the sensed light levels in the lowest X rows of the array, wherein X is a positive integer less than the number of rows in the array.

78. The method defined by Claim 76, wherein said step of determining a background light level comprises the

step of determining a background light level by calculating an average of X percent of the sensed light levels, wherein X is a positive number.

79. The method defined by Claim 76, wherein said step of determining a background light level comprises the step of determining a background light level by calculating an average of X percent of the lowest sensed light levels, wherein X is a positive number.

80. The method defined by Claim 76, wherein said step of determining a peak light level comprises the step of determining a peak light level by calculating an average of Y percent of the sensed light levels indicative of the highest sensed light levels, wherein Y is a positive number.

81. The method defined by Claim 76,

wherein the at least one variable reflectance mirror changes it reflectance in response to the application of a voltage thereto,

wherein said controlling step determines a desired reflectance level for the at least one variable reflectance mirror according to the formula:

$$V_C(z) = V_1 + (R_1 - S \times C_T \times B/P(z)) \times (V_2 - V_1)/(R_1 - R_2),$$

wherein $V_C(z)$ is a voltage representing the desired reflectance level, V_1 is the approximate voltage which, when applied to the at least one variable reflectance mirror, causes the at least one variable reflectance mirror to begin perceptibly decreasing its reflectance from its maximum reflectance level R_1, S is a sensitivity factor, C_T is the maximum contrast ratio of the peak light level to the background light level B is the determined background light level, P(z) is the determined peak light level, and V_2 is the approximate

voltage which, when applied to the at least one variable reflectance mirror, causes the at least one variable reflectance mirror to decrease its reflectance to approximately its minimum reflectance level R_2,

wherein said controlling step comprises the step of applying the voltage $V_C(z)$ to the at least one variable reflectance mirror to cause the at least one variable reflectance mirror to assume the determined desired reflectance level.

82. The method defined by Claim 76,

wherein said sensing step comprises the step of sensing the light level of light incident on each sensing element of the array, and

wherein said method further comprises the step of testing the light level sensed by each sensing element of the array to determine whether each light level is indicative of a peak light level or a background light level.

83. The method defined by Claim 82, wherein said testing step comprises the step of comparing each sensed light level of each sensing element of the array with a predetermined peak threshold value to determine whether each light level is indicative of a peak light level or a background light level.

84. The method defined by Claim 83,

wherein said testing step comprises the step of determining that a sensed light level of a sensing element is indicative of a background light level when the sensed light level is not greater than the peak threshold value, and

wherein said testing step further comprises the step of determining that a sensed light level of a sensing element is indicative of a peak light level

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when the sensed light level is greater than the peak threshold value.

85. The method defined by Claim 84, wherein said background light level determining step comprises the step of determining a background light level by summing the sensed light levels sensed by each sensing element that are determined to be not greater than the peak threshold value and dividing the resulting sum by the number of sensed light levels determined to be not greater than the peak threshold value.

86. The method defined by Claim 85, wherein said peak light level determining step comprises the steps of counting the number of sensed light levels greater than the peak threshold value in a predetermined set of sensed light levels corresponding to a predetermined set of sensing elements of the array, and determining a peak light level in the area rearward of the at least one variable reflectance mirror as a function of the number of sensed light levels greater than the peak threshold value in the predetermined set.

87. The method defined by Claim 76, further comprising the step of:

determining a plurality of peak light levels for a plurality of areas rearward of the at least one variable reflectance mirror,

wherein said controlling step comprises the step of determining a desired reflectance for each of a plurality of variable reflectance mirrors using the determined background light level and the plurality of peak light levels, and

wherein said controlling step further comprises the step of controlling the reflectance of each of the plurality of variable reflectance mirrors using the

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determined desired reflectance for each of the plurality of variable reflectance mirrors.

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